

What is claimed is:

1                   1.       A method for supplying a load voltage to a load, comprising:  
2                   supplying said load voltage from a D.C. power supply coupled to said  
3                   load, wherein said D.C. power supply asserts a first value when an internal voltage is  
4                   above a predetermined voltage, asserts a second value when said load voltage is above a  
5                   reference voltage; and stops output of said load voltage, when said first value and said  
6                   second value are asserted; and  
7                   supplying said load voltage from a redundant D.C. power supply coupled  
8                   to said load, so that said load voltage continues to be supplied even if said D.C. power  
9                   supply stops output of said load voltage.

1                   2.       A D.C. power supply system with overvoltage protection for  
2                   supplying power to a load, comprising a plurality of D.C. power supply circuits connected  
3                   in parallel, said plurality of D.C. power supply circuits comprising:  
4                   a first D.C. power supply circuit of said plurality of D.C. power supply  
5                   circuits comprising:  
6                   a first overvoltage detection circuit for detecting if a voltage internal to  
7                   said first D.C. power supply circuit exceeds a first predetermined voltage;  
8                   a second overvoltage detection circuit for detecting if a first output of said  
9                   first D.C. power supply circuit exceeds a first reference voltage, wherein said first output  
10                  is connected to said load; and  
11                  a first control circuit for shutting off said first D.C. power supply circuit,  
12                  when said first overvoltage detecting circuit detects exceeding of said predetermined  
13                  voltage and said second overvoltage detecting circuit detects exceeding of said reference  
14                  voltage; and  
15                  a second D.C. power supply circuit of said plurality of D.C. power supply  
16                  circuits for continuing to supply power to said load, when said first D.C. power supply  
17                  circuit is shut off due to overvoltage.

1                   3.       A D.C. power supply circuit for obtaining a D.C. output by  
2                   filtering signals that are pulse width-modulated and rectified, said filtering using a filter,  
3                   said D.C. power supply comprising:

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4 a first overvoltage detecting circuit for detecting any surpassing of a first  
5 reference voltage by filtering an input of said filter;  
6 a second overvoltage detecting circuit for detecting any surpassing of a  
7 second reference voltage by filtering an output of said filter; and  
8 a logic circuit for asserting an overvoltage output when said first  
9 overvoltage detecting circuit detects surpassing of said first reference voltage and second  
10 overvoltage detecting circuit detects surpassing of said second reference voltage ,  
11 wherein:  
12 said D.C. output is stopped, when said overvoltage output is asserted.

1 4. The D.C. power supply of claim 1 wherein said filter is a low pass  
2 filter.

1 5. A D.C. power supply circuit for obtaining a D.C. output by  
2 filtering signals that are pulse width-modulated and rectified, said filtering using a  
3 filtering circuit, said D.C. power supply comprising:  
4 a diode coupled at an anode side to said filtering circuit and at a cathode  
5 side to a load; filtering  
6 a first overvoltage detecting circuit for detecting any surpassing of a first  
7 reference voltage by said anode side voltage of said diode;  
8 a second overvoltage detecting circuit for detecting any surpassing of a  
9 second reference voltage by said cathode side voltage of said diode; and  
10 a logic circuit for asserting an overvoltage output when said first  
11 overvoltage detecting circuit detects surpassing of said first reference voltage and second  
12 overvoltage detecting circuit detects surpassing of said second reference voltage, wherein:  
13 said D.C. output is stopped, when said overvoltage output is asserted.

1 6. A D.C. power supply circuit for obtaining a D.C. output by  
2 filtering signals that are pulse width-modulated and rectified, said filtering using a  
3 filtering circuit, said D.C. power supply comprising:  
4 a diode coupled at an anode side to said filtering circuit and at a cathode  
5 side to a load;



1                    11.     The overvoltage circuit of claim 8, wherein said voltage supplying  
2 source comprises a pulse width modulated circuit coupled with a rectifying circuit.

1                    12.     The overvoltage circuit of claim 8, wherein said first overvoltage  
2 detecting circuit comprises a low pass filter coupled with a first comparator.

1                    13.     The overvoltage circuit of claim 12, wherein said low pass filter is  
2 coupled to said input of said filter and said first comparator is coupled to said logic gate.

1                    14.     The overvoltage circuit of claim 12, wherein said low pass filter  
2 comprises a resistor (R) coupled to a capacitor (C).

1                    15.     The overvoltage circuit of claim 8, wherein said second  
2 overvoltage detecting circuit comprises a second comparator.

1                    16.     An overvoltage system for N+1 D.C. power supplies supplying a  
2 load voltage to a load, said N+1 D.C. power supplies coupled together in parallel, wherein  
3 N is an integer, said overvoltage system comprising:

4                    a first power supply of said N+1 D.C. power supplies, comprising:  
5                    a plurality of overvoltage detecting circuits in said first power supply,

6 wherein one overvoltage detecting circuit of said plurality of overvoltage detecting  
7 circuits compares said load voltage with a reference voltage; and

8                    a logic gate receiving outputs of said plurality of overvoltage detecting  
9 circuits for turning off said first power supply when an overvoltage occurs in said first  
10 power supply; and

11                   N other power supplies of said N+1 D.C. power supplies, wherein when  
12 said first power supply is turned off, said N other power supplies continue to supply  
13 power to said load to maintain said load voltage.

1                    17.     A method for stopping operation of a D.C. power supply circuit  
2 with an overvoltage, wherein said D.C. power supply circuit is coupled to a load, said  
3 method comprising:

4                    determining a first comparison value by comparing an output voltage of  
5 said a D.C. power supply circuit to said load with a reference voltage;

6                   determining a second comparison value using at least one voltage internal  
7 to said D.C. power supply circuit;  
8                   evaluating a logic value of said first comparison value logically combined  
9 with said second comparison value; and  
10                  when said logic value indicates said overvoltage, stopping D.C. power  
11 output of said D.C. power supply to said load.

1                   18.     The method of claim 17, wherein when said D.C. power supply  
2 circuit is one of a plurality of D.C. power supply circuits supplying D.C. power to said  
3 load, and when said D.C. power supply circuit stops supplying power due to an  
4 overvoltage, other D.C. power supply circuits of said plurality of D.C. power supply  
5 circuits supply D.C. power needed by said load.

1                   19.     The method of claim 18 wherein logically combined is a logical  
2 and operation.

1                   20.     The method of claim 17, wherein said D.C. power supply circuit  
2 D.C. power supply circuit comprises a pulse width modulation circuit coupled to a  
3 rectifying circuit, said rectifying circuit coupled to a filter circuit;

1                   21.     The method of claim 17, wherein said one voltage internal to said  
2 D.C. power supply circuit includes an input to said filtering circuit.

1                   22.     The method of claim 17, wherein said one voltage internal to said  
2 D.C. power supply circuit includes an output of said filtering circuit.

1                   23.     The method of claim 17 wherein said determining a second  
2 comparison value compares said at least one voltage internal to said D.C. power supply  
3 circuit to either said load voltage or another reference voltage.

1                   24.     An electronic apparatus, comprising a plurality of D.C. power  
2 supply circuits, each D.C. power supply circuit of said plurality of D.C. power supply  
3 circuits for obtaining a D.C. output by filtering a rectified, pulse width-modulated signal,  
4 wherein a D.C. power supply circuit of said plurality of D.C. power supply circuits  
5 comprises:

6 a first overvoltage detecting circuit for detecting any surpassing of a first  
7 reference voltage by an input of said filtering circuit;  
8 a second overvoltage detecting circuit for detecting any surpassing of a  
9 second reference voltage by an output of said filtering circuit; and  
10 a logic circuit for producing an overvoltage state output when said first  
11 overvoltage detecting circuit has surpassed said first reference voltage and said second  
12 overvoltage detecting circuit has surpassed said second reference voltage, wherein:  
13 said D.C. power supply circuit D.C. output is stopped by said overvoltage  
14 state output.

1 25. An electronic apparatus, comprising a plurality of D.C. power  
2 supply circuits, each D.C. power supply circuit of said plurality of D.C. power supply  
3 circuits for obtaining a D.C. output by filtering, a rectified, pulse width-modulated signal,  
4 wherein a D.C. power supply circuit of said plurality of D.C. power supply circuits  
5 comprises:  
6 a diode, including an input coupled to a filtering circuit of said D.C. power  
7 supply circuit and an output coupled to a load;  
8 a first overvoltage detecting circuit for detecting any surpassing of a first  
9 reference voltage by an input voltage of said diode;  
10 a second overvoltage detecting circuit for detecting any surpassing of a  
11 second reference voltage by an output voltage of said diode; and  
12 a logic circuit for producing an overvoltage state output when said first  
13 overvoltage detecting circuit has surpassed said first reference voltage and said second  
14 overvoltage detecting circuit has surpassed said second reference voltage, wherein:  
15 said D.C. power supply circuit D.C. output is stopped by said overvoltage  
16 state output.

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